**Mendalian Genetics Definitions**

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| **Term** | **Definition** | **Example** |
| DNA | A chemical that makes up chromosomes and determines the particular traits we have (i.e. what we look like) |  |
| Chromosome | Structures within the nucleus of cells that contain all our genetic material (DNA) |  |
| Gene | A **specific sequence of DNA** that codes for a particular trait | A specific sequence of DNA is the gene for eye colour |
| Locus (pl. loci) | The **position of a gene** on a chromosome |  |
| Genotype | The **combination of genes** for a particular trait | BB, Bb and bb are all genotypes |
| Phenotype | The **physical characteristics** of an individual | Brown hair, blue eyes |
| Allele | **Different forms of the same gene** (you will receive an allele for each gene from your mother, and an allele for each gene from your father) | You may have one allele for blue eyes and one allele for brown eyes |
| Homozygous / pure-breeding | Having **two copies** **of the same allele** for a particular trait/gene | You may inherit an allele for brown hair from your mother and an allele for brown hair from your father.  AA or aa |
| Heterozygous / hybrid | Having **two different alleles** for a particular trait/gene | You may inherit an allele for brown hair from your mother but an allele for black hair from your father.  Aa |
| Dominant trait | The trait that is seen in the phenotype of a heterozygous individual. An individual only needs **one** copy of the allele for the dominant trait to show this trait.  The allele for the dominant trait is always shown with a **capital letter** | If an individual receives the allele for blue eyes from his/her mother and the allele for brown eyes from his/her father and brown eyes is the dominant trait, he/she will have brown eyes.  B  Genotypes of BB and Bb will result in the dominant trait in the offspring |
| Recessive trait | The trait that is masked in the phenotype of a heterozygous individual. An individual needs **two** copies of the allele for the recessive trait to show this trait.  The allele for a recessive trait is always shown with a **lower case letter** | If an individual receives the allele for blue eyes from his/her mother and the allele for brown eyes from his/her father and blue eyes is the recessive trait, he/she will have brown eyes.  b  A genotype of bb will result in the recessive trait in the offspring |

**Using the definitions above, answer the following questions:**

1. Which is smaller, a gene or a chromosome? Explain.
2. Brian noted that his daughter Sarah had blonde hair and brown eyes. Brian was referring to Sarah’s genotype/phenotype/allele/locus.
3. When referring to coat colour of rabbits, a scientist referred to the rabbit as the ‘Bb’ rabbit. The scientist is talking about the rabbit’s genotype/phenotype/allele/locus.
4. An individual who has a genotype of HH or hh can be said to be homozygous/heterozygous/dominant/recessive for this particular trait.
5. An individual who has a genotype of Hh can be said to be homozygous/heterozygous/recessive for this particular trait.
6. For one particular trait there may be many alleles/chromosomes/DNA molecules. For example, there is a/an allele/chromosome/DNA molecule for blue eyes, one for brown eyes and one for green eyes.
7. The eye colour of flies can either be red or white. Two red-eyed flies were bred and produced a white-eyed offspring. Which trait – red-eyed or white-eyed – is dominant, and which is recessive. Explain.

**Answers**

1. Gene – many genes make up one chromosome.
2. Phenotype
3. Genotype
4. Homozygous
5. Heterozygous
6. Allele
7. Red-eyed dominant, white-eyed recessive. Both parents were heterozygous (e.g. Tt) and the offspring inherited the allele for recessive trait from both parents, making it white-eyed.